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Director's Rule 3-87

Applicant	Page of	Supersedes
CITY OF SEATTLE DEPARTMENT OF CONSTRUCTION AND LAND USE	1 2	15-85
	Publication Jan. 26, 1987	Effective March 2, 1987
	Code and Section Reference Section 25.05 SMC (SEPA)	
Subject ENERGY CONSUMPTION AND PEAK DEMAND INFORMATION FOR ENVIRONMENTAL REVIEW	Type of Rule Code Interpretation	
	Ordinance Authority Section 3.06.040 SMC	
Index SEPA/ENERGY - TECHNICAL REQUIREMENTS	Approved Holly Miller	Date 2-19-87

Rule: Building projects with 50,000 or more square feet of new gross conditioned floor area are required to provide an estimate of energy consumption as part of the energy section of the environmental checklist or environmental impact statement. These estimates are not intended to project actual building performance, but only to disclose an approximate level of consumption and peak demand that might be reasonably expected. The energy estimates prepared pursuant to this rule are to cover the entire building project, both conditioned and unconditioned space. The information is required for an application to be considered complete and accepted for processing by the Department.

For fuels other than electricity, the applicant is responsible for obtaining estimates of energy consumption.

For electric energy consumption, applicant may use either of the following two options:

OPTION I: WORKSHEETS

The applicant may use the electric energy consumption and peak load worksheets for different building types provided in the attachment. These worksheets are designed to help applicants provide estimates for the annual consumption and peak load demand based on the average usage per square foot per year of similar buildings.

The applicant only needs to use the worksheet(s) that apply to their project. For buildings with mixed use occupancy, worksheets are provided to determine usage on a proportional basis.

Definitions:

1. Energy Use Index and Total Energy Use. The method used in the worksheet to estimate the annual electrical consumption for the proposed building projects. This number helps Seattle City Light plan programs and forecast electrical requirements.

2. Winter Peak Demand. The maximum electrical energy used in any fifteen minute period during the winter. The winter peak demand occurs at the time when the load on Seattle City Light's system approaches or exceeds the generating capacity.

3. Summer Peak Demand. The maximum electrical energy used in any fifteen minute period during the summer. In many buildings, the maximum energy used in the summer will exceed that in the winter due to air conditioning or refrigeration loads. In these buildings, the summer peak demand is an indication of the maximum load placed on the system by the proposed building.

OPTION II: COMPUTER MODELING

The applicant may perform computer modeling in accordance with the systems analysis chapter of the Seattle Energy Code. For the purpose of this analysis only, the ASHRAE TC 4.7 method or equivalent is acceptable. The analysis must be submitted to the building official for approval and must provide enough detail for a decision to be made by the building official and Superintendent of City Light. The building official may request meeting(s) with, or additional information from, the applicant as necessary to establish the reasonableness of any proposal to the satisfaction of the building official and the Superintendent.

For both options, calculations based on schematic building designs as used in the environmental review process are acceptable.

ESTIMATION OF ELECTRICAL ENERGY CONSUMPTION AND PEAK DEMAND

WORKSHEETS

FOR ENVIRONMENTAL REVIEW

USE ONLY THOSE WORKSHEET(S) THAT APPLY TO YOUR PROJECT

(See instructions to determine which worksheet(s) to use)

Electricity consumption and peak load multipliers have been developed for a variety of different building types which may be used by the applicant to fulfill the energy section requirements of the environmental review. Worksheets are provided for the following building types:

Eating and Drinking Establishments
Equipment Dominated Buildings*
Grocery Stores
Health Clubs
Hospitals
Hotels
Motels
Nursing Homes
Offices (Four or More Stories)
Offices (Less than Four Stories)
Residential (Duplex, Triplex, and Fourplex Development)
Residential (Large Multi-Family Buildings)
Residential (Single Family Residential Developments)
Retail
Schools
Theaters
Warehouses (Refrigerated)
Warehouses (Non-Refrigerated)

* Laundries, telephone switching stations, etc.

INSTRUCTIONS

STEP 1: **Determine Whether Single or Multi-Use Analysis is Needed** (Section I of Summary Sheet)

When one use is expected in the building project, the applicant may proceed to Step 2. For buildings with multiple use occupancies such as a downtown office building with ground floor retail and restaurants, the applicant may complete the worksheet for just the primary use based on the total gross-floor area of the project except under the following circumstances:

Offices can be treated as a single use building unless:

a. Retail stores comprise over 25% of the total floor area; or

b. Theaters or parking garages comprise over 10% of the total floor area; or

c. Grocery stores, restaurants, and health clubs comprise over 2% of the total floor area.

Retail Stores can be treated as a single use building unless:

a. Offices comprise over 25% of the total floor area; or

b. Theaters or parking garages comprise over 10% of the total floor area; or

c. Grocery stores, restaurants, and health clubs comprise over 2% of the total floor area.

Residential buildings can be treated as a single use building unless:

a. Retail Stores or offices comprise over 10% of the total floor area; or

b. Theaters or parking garages comprise over 5% of the total floor area; or

c. Grocery stores, restaurants, and health clubs comprise over 2% of the total floor area.

With these projects, the applicant must complete worksheets for each of the uses and its corresponding square footage (multi-use analysis).

STEP 2: Complete the Appropriate Worksheets.

Choose the appropriate worksheet(s). On each worksheet, the applicant is asked a few key questions regarding the expected operation or design of the building to determine its energy use. Default values are provided for use where the applicant does not have the information at this time. For many end uses, such as lighting in office buildings, electricity consumption in buildings is very similar and an average is provided. If the applicant believes his/her building will differ from this average, please provide a replacement value.

STEP 3: Transfer the Worksheet Information onto the Summary Sheet (Section II of the Summary Sheet)

Each worksheet, except residential, has the Energy Use Index (kwh/sq.ft./yr) labeled (B), the Winter Peak Demand (watts/sq.ft.) labeled (C), and the Summer Peak Demand (watts/sq.ft.) labeled (D). Transfer this information to the summary sheet. If you have a Multi-Use Analysis, you will have a (B), (C), and (D) for each area from the Worksheet for that area. Multiply the unit energy use times the area (A) to obtain each areas energy use. Total the Columns to obtain the total energy use for multi-use buildings. For Residential areas, the energy use (A x B) will already be determined on the worksheet. Transfer this number directly onto Column 1 of the Summary Sheet. Submit the worksheets and summary sheets with your environmental checklist or environmental impact statement.

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

SUMMARY

ESTIMATION OF ELECTRICAL ENERGY CONSUMPTION AND PEAK DEMAND

I. List Building Uses and Size

	Square Feet	% of Gross Floor Area (Entire Building or Development)
Primary Use (Area 1) _____	_____	_____
Other Uses (Area 2) _____	_____	_____
(Area 3) _____	_____	_____
(Area 4) _____	_____	_____
TOTAL	_____	100%

II.

BUILDING TYPE/USE SIZE & PER UNIT ENERGY USE	COLUMN 1 kwh/yr	COLUMN 2 watts	COLUMN 3 watts
Area 1 USE: _____			
SIZE: _____ (A)			
EUI*: _____ (B)	_____		
WINTER PEAK: _____ (C)	(AxB)	_____	
SUMMER PEAK: _____ (D)		(AxC)	_____
			(AxD)
Area 2 USE: _____			
SIZE: _____ (A)			
EUI*: _____ (B)	_____		
WINTER PEAK: _____ (C)	(AxB)	_____	
SUMMER PEAK: _____ (D)		(AxC)	_____
			(AxD)
Area 3 USE: _____			
SIZE: _____ (A)			
EUI*: _____ (B)	_____		
WINTER PEAK: _____ (C)	(AxB)	_____	
SUMMER PEAK: _____ (D)		(AxC)	_____
			(AxD)
Area 4 USE: _____			
SIZE: _____ (A)			
EUI*: _____ (B)	_____		
WINTER PEAK: _____ (C)	(AxB)	_____	
SUMMER PEAK: _____ (D)		(AxC)	_____
			(AxD)

Total Energy Use: (Add Numbers in Column 1) = _____ kwh/yr.
If major project, list 90% of total energy use (.9 x total energy): = _____ kwh/yr.

Total Winter Peak: (Add Numbers in Column 2; = _____ watts.
Divide Column 2 by 1,000) = _____ kw.

Total Summer Peak: (Add Numbers in Column 3; = _____ watts.
Divide Column 3 by 1,000) = _____ kw.

*EUI - Refers to the Energy Use Index. It is labeled as (B) on the worksheets.

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

EATING AND DRINKING ESTABLISHMENTS

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Heating Fuel (Gas or Electric) _____

Cooking done predominantly with electricity or gas _____

ENERGY USE		kwh/sq.ft./year
STEP 1:	Lighting Energy Use	12.2
STEP 2:	Fan Energy Use	4.9
STEP 3:	Heating Energy Use	

If the building has gas heat, use 0.
If the building has electric heat, use 16.4.

STEP 4:	Cooling Energy Use	4.4
STEP 5:	Cooking Energy Use	

If the cooking equipment is predominantly gas, use 7.9.
If the cooking equipment is predominantly electric, use 32.2.

STEP 6:	Miscellaneous Energy Use	15.7
STEP 7:	ENERGY USE INDEX (EUI)	_____ (B)

Add 1 through 6 to obtain the total Energy Use Index.

PEAK DEMAND		Watts./sq.ft.
STEP 8:	Winter Peak Demand	_____ (C)

If cooking predominantly with gas, use 11.4.
If cooking predominantly with electricity, use 30.8.

STEP 9:	Summer Peak Demand	_____ (D)

If cooking predominantly with gas, use 15.5.
If cooking predominantly with electricity, use 27.6.

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

EQUIPMENT DOMINATED BUILDINGS

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Operating Hours per Week _____
If operating housrs are not known at this time, use 80 hours/week.

Connected Motor Load _____ hp
_____ hp/1000 sq.ft.

Connected Equipment Load _____ kw
_____ kw/1000 sq.ft.

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use 4.6

STEP 2: Heating Energy Use _____
If the building has gas heat, enter 0.
If the building has electric heat, enter 8.4.

STEP 3: Cooling Energy Use _____
If there is no cooling, enter 0.
If the building does have cooling, enter 2.9.

STEP 4: Motor Energy Use _____
Use Table E-1 to obtain motor energy use.

STEP 5: Equipment Energy Use _____
Use Table E-2 to obtain equipment energy use.

STEP 6: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 5 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 7: Winter Peak Demand _____ (C)
To determine winter peak demand, use Table E-3 and add the motor load and equipment load.

Motor Load _____
Equipment Load _____

STEP 8: Summer Peak Demand _____ (D)
Same as Winter Peak Demand.

TABLE E-1
MOTOR ENERGY USE
(kwh/sq.ft./yr)

Operating Hours/Week	hp/1000 sq. ft.				
	less than 10	10 - 30	31 - 50	51 - 70	more than 70
Less than 80	10	40	81	121	162
80 - 115	14	58	116	174	231
More than 115	22	87	173	260	347

TABLE E-2
EQUIPMENT ENERGY USE
(kwh/sq.ft./yr)

Operating Hours/Week	kw/1000 sq.ft.					
	less than 10	10 - 30	31- 50	51 - 70	71 - 90	more than 90
Less than 80	17	68	138	209	276	349
80 - 115	24	96	194	301	388	500
More than 115	38	152	304	450	609	750

TABLE E-3
MOTOR LOAD PEAK DEMAND
(watts/sq. ft.)

hp/1000 sq.ft.				
less than 10	10 - 30	31 - 50	51 - 70	more than 70
4	14	29	43	58

TABLE E-4
EQUIPMENT LOAD PEAK DEMAND
(watts/sq. ft.)

kw/1000 sq.ft.				
less than 10	10 - 30	31 - 50	51 - 70	more than 70
6	25	50	75	100

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

GROCERY STORES

Gross Area: (Conditioned + Unconditioned) _____sq.ft. (A)

Proposed Operating Hours _____hours/week
This includes night stocking. If operating hours are not known at this time, use 140 hours per week.

Lighting Power Density _____watts/sq.ft
If lighting power density is not know, use 1.5.

Percent of Refrigerated Display at Low Temperature _____
If percentage is not known, use 42%

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
Use Table G-1 to obtain the lighting energy use.

STEP 2: Heating Energy Use _____
If the heat recovery system will provide all of the heat, use 0.
If there is an additional source of heat, use 2.5.

STEP 3: Cooling Energy Use _____
If the percentage of low temperature cases is less than 25%, use 3.2.
If the percentage is 25-40%, use 2.3.
If the percentage is greater that 40%, use 1.5.

STEP 4: Refrigeration Energy Use _____
If the percentage of low temperature cases is less than 36%, use 19.4.
If the percentage is 36-44%, use 26.0.
If the percentage is greater than 44%, use 32.5.

STEP 5: Miscellaneous Energy Use _____
If there is a bakery, use 9.3.
If there is not a bakery, use 6.3.

STEP 6: ENERGY USE INDEX (EUI) _____(B)

Add 1 through 5 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 7: Winter Peak Demand 4.1 (C)

STEP 8: Summer Peak Demand 4.0 (D)

TABLE G-1
LIGHTING ENERGY USE
(kwh/sq.ft./yr)

Hours of Operation Per Week	Lighting Power Density (watts/sq.ft.)		
	Less than 2.0	2.0 - 2.5	More than 2.5
Less than 121	12.7	14.2	16.4
121 - 145	14.9	16.8	19.5
More than 145	16.7	18.9	23.2

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

HEALTH CLUBS

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Heating Fuel (Gas or Electric) _____

Hot Water Fuel (Gas or Electric) _____

ENERGY USE		kwh/sq.ft./year
STEP 1:	Lighting Energy Use	11.0
STEP 2:	Fan Energy Use	3.7
STEP 3:	Heating Energy Use If club has gas heat, use 0. If club has electric heat, use 14.2.	
STEP 4:	Cooling Energy Use	2.5
STEP 5:	Hot Water Energy Use If club uses gas for hot water, use 0. If club uses electricty for hot water, use 39.3.	
STEP 6:	Miscellaneous Energy Use If the club has a kitchen, use 6.9. If the club has no kitchen, use 3.9.	
STEP 7:	ENERGY USE INDEX (EUI)	_____ (B)

Add 1 through 6 to obtain the Total Energy Use Index.

PEAK DEMAND		Watts./sq.ft.
STEP 8:	Winter Peak Demand To determine winter peak demand, use Table HC-1.	_____ (C)
STEP 9:	Summer Peak Demand If gas water heating, use 6.8. If electric water heating, use 10.0.	_____ (D)

TABLE HC-1
WINTER PEAK DEMAND
(watts/sq.ft.)

Water Heat	Space Heat	
	Gas	Electric
Gas	5.9	8.0
Electric with gas backup	10.2	12.3
Electric	12.2	14.1

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

HOSPITALS

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Lighting Power Density _____ watts/sq.ft.
If the lighting power density is not known, use 2.0.

ENERGY USE		kwh/sq.ft./year
STEP 1:	Lighting Energy Use If the lighting power density is less than 1.51 watts/sq.ft., use 8.4. If it is 1.51 to 1.75 watts/sq. ft., use 11.4. If it is more than 1.75 watts/sq.ft., use 16.2.	_____
STEP 2:	Fan Energy Use	13.5
STEP 3:	Cooling Energy Use If the lighting power density is less than 1.51 watts/sq.ft., use 3.1. If it is 1.51 to 1.75 watts/sq.ft., use 3.4. If it is more than 1.75 watts/sq.ft., use 3.7.	_____
STEP 4:	Miscellaneous Energy Use If there is a kitchen, use 3.7. If there is no kitchen, use 2.0.	_____
STEP 5:	ENERGY USE INDEX (EUI)	_____ (B)

Add 1 through 4 to obtain the Total Energy Use Index.

PEAK DEMAND		Watts./sq.ft.
STEP 6:	Winter Peak Demand	3.9 (C)
STEP 7:	Summer Peak Demand	5.2 (D)

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

HOTELS

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Lighting Power Density _____ watts/sq.ft.
If the lighting power density is not known, use 2.0.

Number of Rooms per 1,000 sq.ft. _____
If the number of rooms is not known, use 1.7.

Percent of Area in Meeting Rooms _____
If the percent of area is not known, use 15%.

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
Use Table H-1 to obtain the lighting energy use.

STEP 2: Heating Energy Use _____
If the number of rooms per 1,000 sq.ft. is less that 1.81, use 4.2.
If the number of rooms is 1.81-2.4, use 5.8.
If the number of rooms is more than 2.4, use 7.3.

STEP 3: Cooling Energy Use _____
If the lighting power density is less than 3.3 watts/sq.ft., use 0.7.
If the lighting power density is between 3.3-4.5, use 0.9.
If the lighting power density is more than 4.5, use 1.2.

STEP 4: Hot Water Energy Use _____
If the building has gas hot water, use 0.
If the number of rooms per 1,000 sq.ft. is less than 1.81, use 4.0.
If the number of rooms is between 1.81-2.4, use 5.6.
If the number of rooms is more than 2.4, use 7.1.

STEP 5: Miscellaneous Energy Use _____
If there are no restaurants in the building, use 0.
If there is 1 restaurant, use 12.
If there are 2 restaurants, use 14.1.
If there are 3 or more restaurants, use 16.1.

STEP 6: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 5 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 7: Winter Peak Demand _____ (C)
If there is gas heat, use 3.8.
If there is electric heat, use 5.2.

STEP 8: Summer Peak Demand 4.3 (D)

TABLE H-1
LIGHTING ENERGY USE
(kwh/sq.ft./yr.)

Number of Rooms Per 1,000 sq.ft.	Lighting Power Density (watts/sq. ft.)		
	Less than 1.66	1.66-2.00	More than 2.00
Less than 1.80	5.8	7.0	9.1
1.80 - 2.40	3.9	4.4	5.5
More than 2.40	3.2	3.6	4.2

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

MOTELS

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Lighting Power Density _____ watts/sq.ft.
If the lighting power density is not known, use 1.7.

Number of Rooms per 1,000 sq.ft. _____
If the number of rooms per 1,000 sq.ft. is not known, use 1.8.

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
Use Table M-1 to obtain the lighting energy use.

STEP 2: Heating Energy Use _____
If the building has gas heat, use 0.
If the number of rooms/1,000 sq.ft. is less than 1.8, use 5.8.
If the number of rooms is 1.8-2.4, use 7.4.
If the number of rooms is more than 2.4, use 8.7.

STEP 3: Cooling Energy Use 0.9

STEP 4: Hot Water Energy Use _____
If the building has hot water heated by gas, use 0.
If the number of rooms per 1,000 sq.ft. is less than 1.81, use 4.0.
If the number of rooms is between 1.8-2.4, use 5.6.
If the number of rooms is more than 2.4, use 7.1.

STEP 5: Miscellaneous Energy Use _____
If there are no restaurants, use 2.8.
If there is one or more restaurants, use 6.3.

STEP 6: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 5 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 7: Winter Peak Demand _____ (C)
If there is gas heat, use 3.6.
If there is electric heat, use 6.0.

STEP 8: Summer Peak Demand 4.3 (D)

TABLE M-1
LIGHTING ENERGY USE
(kwh/sq.ft./yr.)

Number of Rooms Per 1,000 sq.ft.	Lighting Power Density (watts/sq. ft.)		
	Less than 1.65	1.65-2.00	More than 2.00
Less than 1.8	3.8	4.6	6.0
1.8 - 2.4	2.6	2.9	3.6
More than 2.4	2.1	2.4	2.8

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

NURSING HOMES

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Heating Fuel (Gas or Electric) _____
Heat Pump (Yes or No) _____
If not known at this time, assume yes.
Percent of building with cooling _____

Beds per 1,000 sq.ft. _____
If the number of beds per 1,000 sq.ft. is not know, use 2.5.
Cooking predominantly gas or electric _____

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use 10.2

STEP 2: Heating Energy Use _____
If the building has gas heat, use 0.
If the building has an electric resistance system, use 11.5.
If the building has a heat pump, use 9.0.

STEP 3: Cooling Energy Use _____
If the building does not have cooling, use 0.
If lesser than 31% of the building is cooled, use 1.1.
If 31-60% is cooled, use 2.2.
If more than 60% is cooled, use 3.2.

STEP 4: Hot Water Energy Use _____
If the building has gas hot water, use 0.
If the number of beds per 1,000 sq.ft. is less than 2.1, use 1.2.
If the number of beds is 2.1-2.6, use 2.5.
If the number of beds is more than 2.6, use 3.8.

STEP 5: Miscellaneous Energy Use _____
If there is an all electric kitchen, use 4.9.
If there is a dual fuel kitchen, use 1.6.

STEP 6: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 5 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 7: Winter Peak Demand _____ (C)
If the building is all electric, use 13.6.
If the building has gas heat and electric cooking, use 6.3.
If there is gas heat and gas cooking, use 3.9.

STEP 8: Summer Peak Demand _____ (D)
If the building is all electric, use 12.5.
If the building has gas heat and electric cooking, use 8.0.
If there is gas heat and gas cooking, use 5.8.

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

OFFICES
(Four or more Stories)

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

		ENERGY USE	kwh/sq.ft./year
STEP 1:	Lighting Energy Use		7.6
STEP 2:	Fan Energy Use		2.4
STEP 3:	Heating Energy Use		2.2
STEP 4:	Cooling Energy Use		1.7
STEP 5:	Miscellaneous Energy Use If the building will contain a large main frame computer or a large amount of studio equipment, use 10.0. If not, use 4.2.		
STEP 6:	ENERGY USE INDEX (EUI)		_____ (B)

Add 1 through 5 to obtain the Total Energy Use Index.

		PEAK DEMAND	Watts./sq.ft.
STEP 7:	Winter Peak Demand		4.1 (C)
STEP 8:	Summer Peak Demand		4.0 (D)

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

OFFICES
(Less than Four Stories)

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Proposed Business Hours _____ hours/week
If the business hours are not known at this time, use 55 hours.

Lighting Power Density _____ watts/sq.ft.
If the lighting power denisty is not known, use 1.7.

Building Size _____ sq.ft.

Heating Fuel (Gas or Electric) _____

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
Use Table SO-1 to obtain the lighting energy use.

STEP 2: Heating Energy Use _____
If the building has gas heat, use 0.
If the building has electric heat, use Table SO-2 to obtain the heating energy use.

STEP 3: Cooling Energy Use _____
If the building has no cooling, use 0.
If the building has cooling, use Table SO-3 to obtain the cooling energy use.

STEP 4: Miscellaneous Energy Use _____
If there is a large amount of equipment such as a main-frame computer, use 5.0.
If there is no large amount of equipment, use 1.7.

STEP 5: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 4 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 6: Winter Peak Demand _____ (C)
If there is electric heating, use 8.5.
If the heat is non-electric, use 2.2.

STEP 7: Summer Peak Demand 5.7 (D)

TABLE SO-1
LIGHTING ENERGY USE
(kwh/sq.ft./yr.)

Business Hours Per Week	Lighting Power Density (watts/sq. ft.)		
	Less than 1	1.0 - 1.4	More than 1.4
Less than 56	3.9	5.3	6.4
56 - 70	4.3	6.1	7.6
More than 70	5.0	7.5	9.5

TABLE SO-2
HEATING ENERGY USE
(kwh/sq.ft./yr.)

Business Hours Per Week	Building Area (Per Building in Cluster)		
	Less than 10,001	10,001-20,000	More than 20,000
Less than 56	5.5	4.5	4.1
56 - 70	5.9	4.6	4.2
More than 70	6.6	4.9	4.3

TABLE SO-3
COOLING ENERGY USE
(kwh/sq.ft./yr.)

Business Hours Per Week	Occupied Area Lighting (watts/sq. ft.)			
	Less than 1	1.01 - 1.40	1.41 - 1.70	More than 1.70
Less than 56	1.9	2.4	2.6	2.9
56 - 70	2.0	2.8	3.1	3.4
More than 70	2.3	3.3	3.7	4.2

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

PARKING GARAGE

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Number of Floors _____

Is garage above ground? (Yes or No) _____

ENERGY USE		kwh/sq.ft./year	
STEP 1:	Lighting Energy Use	1.3	
STEP 2:	Fan Energy Use	_____	
	If parking is above ground, enter 0. If parking is below ground, enter 0.3.		
STEP 3:	Miscellaneous Energy Use	_____	
	If parking area is less than 3 floors, enter 0. If parking area is 3 floors or more, enter 0.1.		
STEP 4:	ENERGY USE INDEX (EUI)	_____	(B)
	Add 1 through 3 to obtain the Total Energy Use Index.		
PEAK DEMAND		Watts./sq.ft.	
STEP 5:	Winter Peak Demand	0.5	(C)
STEP 6:	Summer Peak Demand	0.5	(D)

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

DUPLEX, TRIPLEX, AND FOURPLEX RESIDENTIAL DEVELOPMENTS

Number of Residential Units in Project (A) _____

ENERGY USE		kwh/year	
STEP 1:	Appliance Energy Use Use 5,500 x No. of units	_____	
STEP 2:	Hot Water Energy Use If the buildings have gas heated water, use 0. If the buildings have water heaters in each unit, use 3,500 x No. of units.	_____	
STEP 3:	Space Heat Energy Use If the buildings have gas or oil heat, use 0. If the buildings have electric resistance heat, use 4,100 x No. of units. If the buildings have an electric heat pump, use 2,700 x No. of units.	_____	
STEP 4:	Energy Use Add lines 1 through 3	_____	[1](A X B)
PEAK DEMAND		WATTS	
STEP 5:	Winter Peak Demand If there is gas heat, use 2200 x no. of units. If there is electric heat, use 3400 x no. of units.	_____	[2](A X C)
STEP 6:	Summer Peak Demand 1300 x no. of units.	_____	[3](A X D)

1 Enter this number in Column 1 on Summary Sheet.
2 Enter this number in Column 2 on Summary Sheet.
3 Enter this number in Column 3 on Summary Sheet.

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

LARGE MULTI-FAMILY RESIDENTIAL BUILDINGS

Number of Residential Units in Project (A) _____

		ENERGY USE	kwh/year
STEP 1:	Appliance Energy Use Use 2,800 x No. of units		_____
STEP 2:	Hot Water Energy Use If the buildings have gas heated water, use 0. If the buildings have central electric water heat, use 6,100 x No. of units. If the buildings have water heaters in each unit, use 3,500 x No. of units.		_____
STEP 3:	Space Heat Energy Use If the buildings have gas or oil heat, use 0. If the buildings have electric resistance heat, use 4,100 x No. of units. If the buildings have an electric heat pump, use 2,700 x No. of units.		_____
STEP 4:	Energy Use Add lines 1 through 3		_____ [1](A X B)
		PEAK DEMAND	WATTS
STEP 5:	Winter Peak Demand If there is gas heat, use 2200 x no. of units. If there is electric heat, use 3400 x no. of units.		_____ [2](A X C)
STEP 6:	Summer Peak Demand 1300 x no. of units.		_____ [3](A X D)

1 Enter this number in Column 1 on Summary Sheet.
2 Enter this number in Column 2 on Summary Sheet.
3 Enter this number in Column 3 on Summary Sheet.

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

SINGLE FAMILY
RESIDENTIAL
DEVELOPMENTS

Number of Residential Units in Project (A) _____

ENERGY USE		kwh/year	
STEP 1:	Appliance Energy Use Use 7,200 x No. of units	_____	
STEP 2:	Hot Water Energy Use If the buildings have gas heated water, use 0. If the buildings have water heaters in each unit, use 3,800 x No. of units.	_____	
STEP 3:	Space Heat Energy Use If the buildings have gas or oil heat, use 0. If the buildings have electric resistance heat, use 8,500 x No. of units. If the buildings have an electric heat pump, use 5,600 x No. of units.	_____	
STEP 4:	Energy Use Add lines 1 through 3	_____	[1](A X B)
PEAK DEMAND		WATTS	
STEP 5:	Winter Peak Demand If there is gas heat, use 2200 x no. of units. If there is electric heat, use 3400 x no. of units.	_____	[2](A X C)
STEP 6:	Summer Peak Demand 1300 x no. of units.	_____	[3](A X D)

1 Enter this number in Column 1 on Summary Sheet.
2 Enter this number in Column 2 on Summary Sheet.
3 Enter this number in Column 3 on Summary Sheet.

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

RETAIL STORES

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Proposed Business Hours _____ hours/week
If business hours are not known at this time, use 50 hours for a downtown store, and 77 hours for other stores.

Lighting Power Density _____ watts/sq.ft.
If the lighting power density is not known, use 1.4 for a single large store or 2.5 for a mall or cluster of small stores.

Heating Fuel (Gas or Electric) _____

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
Use Table R-1 to obtain the lighting energy use.

STEP 2: Fan Energy Use _____
If multi-story and 100,000 sq.ft. or more, use 1.8.
Otherwise, use 0.5.

STEP 3: Heating Energy Use _____
If the building has non-electic heat, use 0.
Use Table R-2 to obtain the heating energy use.

STEP 4: Cooling Energy Use _____
Use Table R-3 to obtain the cooling energy use.

STEP 5: Miscellaneous Energy Use 2.1

STEP 6: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 5 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 7: Winter Peak Demand _____ (C)
Use Table R-4 to obtain winter peak demand.

STEP 8: Summer Peak Demand _____ (D)
If 100,000 sq.ft. or larger, use 5.7.
Otherwise, use 5.0.

TABLE R-1
LIGHTING ENERGY USE
(kwh/sq.ft./yr.)

Business Hours Per Week	Lighting Power Density (watts/sq. ft.)			
	Less than 1	1.00 - 1.50	1.51 - 2.00	More than 2.00
Less than 56	2.4	5.7	7.8	10.9
56 - 65	2.9	6.9	9.4	13.1
More than 65	6.4	7.8	12.1	15.0

TABLE R-2
HEATING ENERGY USE
(kwh/sq.ft./yr.)

Lighting Power Density (watts/sq.ft.)		
Less than 1.21	1.21 - 2.00	More than 2.00
2.7	2.2	1.9

TABLE R-3
COOLING ENERGY USE
(kwh/sq.ft./yr.)

Business Hours Per Week	Occupied Lighting (watts/sq. ft.)		
	Less than 1.21	1.21 - 2.00	More than 2.0
Less than 56	0.8	1.1	1.5
56 - 65	0.9	1.4	1.7
More than 65	1.1	2.2	2.5

TABLE R-4
WINTER PEAK DEMAND
(watts/sq.ft.)

Size	Electric Heat	Non-Electric Heat
100,000 sq. ft. or more	4.9	3.8
Less than 100,000 sq. ft.	7.8	4.4

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

SCHOOLS

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

School Hours _____ hours/week
If hours are not known at this time, use 40 for an elementary school and 50 for a high school or middle school.

Lighting Power Density _____ watts/sq.ft.
If the lighting power density is not known, use 2.0.

Heating Fuel (Gas or Electric) _____
Heat Pump (Yes or No) _____
If not known at this time, assume yes.

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
Use Table S-1 to obtain the lighting energy use.

STEP 2: Heating Energy Use _____
If the building has gas heat, use 0.
If there are heat pumps, use 13.8.
If there is resistance heating, use 11.3.

STEP 3: Cooling Energy Use _____
If the building does not have cooling, use 0.
If the lighting power density is less than 1.8 watts/sq.ft., use 2.3.
If it is 1.8 watts/sq.ft. or more, use 2.7.

STEP 4: Miscellaneous Energy Use _____
If it is an elementary school, use 1.5.
If it is a middle school or high school, use 3.0.

STEP 5: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 4 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 6: Winter Peak Demand _____ (C)
To obtain winter peak demand, use Table S-2.

STEP 7: Summer Peak Demand — Not Required (D)

TABLE S-1
LIGHTING ENERGY USE
(kwh/sq.ft./yr.)

School Hours/Week	Lighting Power Density (watts/sq. ft.)	
	Less than 1.8	1.8 or more
Less than 40	3.0	3.5
40 - 45	4.0	4.7
More than 45	5.5	6.5

TABLE S-2
WINTER PEAK DEMAND
(watts/sq.ft.)

Heat	Building Size - (sq.ft.)		
	40,000-100,000	100,0001-165,000	More than 165,000
Electric	11.9	10.2	8.2
Non-Electric	5.0	4.3	3.4

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

THEATERS

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Proposed Shows per Week _____
If shows per week is not known at this time, use 28.

Number of Theaters _____

Heating Fuel (Gas or Electric) _____

ENERGY USE — kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
If there are 1-3 theaters, use 3.8.
If there are 4 or more theaters, use 4.9.

STEP 2: Heating Energy Use _____
If there is non-electric heat, use 0.
For electrically heated buildings:
If there are 14-20 shows per week, use 8.3.
If there are 21-27 shows, use 9.6.
If there are 28-34 shows, use 11.0.
If there are 35 or more shows a week, use 12.3.

STEP 3: Cooling Energy Use 3.1

STEP 4: Miscellaneous Energy Use _____
If there are 14-20 shows per week, use 1.5.
If there are 21-27 shows, use 3.3.
If there are 28-34 shows, use 5.8.
If there are 3 or more shows per week, use 8.3.

STEP 5: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 4 to obtain the Total Energy Use Index.

PEAK DEMAND — Watts./sq.ft.

STEP 6: Winter Peak Demand _____ (C)
If there is gas heat, use 8.2.
If there is electric heat, use 10.5.

STEP 7: Summer Peak Demand 5.7 (D)

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

WAREHOUSES
(Non-Refrigerated)

Gross Area: (Conditioned + Unconditioned) _____sq.ft. (A)

Proposed Business Hours _____hours/week
If business hours are not known at this time, use 55.

Lighting Power Density _____watts/sq.ft.
If the lighting power denisty is not know, use 0.7.

Office Heating Fuel _____

Percent Non-warehouse Space _____
If the percent non-warehouse space is not known at this time, use 27.

Warehouse Setpoint Temperature _____degrees F.
If the warehouse setpoint temperature is not known at this time, use 45 degrees F.

ENERGY USE kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
Use Table NRW-1 to obtain lighting energy use.

STEP 2: Heating Energy Use _____
If the office has non-electric heat, use 0.
If the setpoint temperature is less than 35 degrees F., use 0.3.
If the setpoint temperature is 35-50 degrees F., use 0.9.
If the setpoint temperature is more than 50 degrees F., use 1.8.

STEP 3: Battery Charger Energy Use _____
If the forklift uses propane, use 0.
If it uses electricity, use 2.0.

STEP 4: Miscellaneous Energy Use _____
If the percentage of non-warehouse space is less than 11%, use 1.6.
If the percentage is 11-50%, use 2.1.
If the percentage is more than 50%, use 3.2.

STEP 5: ENERGY USE INDEX (EUI) _____(B)

Add 1 through 4 to obtain the total energy use.

PEAK DEMAND Watts./sq.ft.

STEP 6: Winter Peak Demand _____(C)
Use Table NRW-2 to obtain winter peak demand.

STEP 7: Summer Peak Demand _____(D)
Use Table NRW-2 to obtain summer peak demand.

TABLE NRW-1
LIGHTING ENERGY USE
(kwh/sq.ft./yr.)

Business Hours Per Week	Lighting Power Density (watts/sq. ft.)		
	Less than 0.68	0.68 - 1.34	More than 1.34
Less than 56	1.0	3.0	4.9
56 - 70	1.3	3.9	6.5
More than 70	1.7	5.0	8.2

TABLE NRW-2
PEAK DEMAND
(watts/sq.ft.)

	Lighting Power Density (watts/sq. ft.)		
	Less than 0.68	0.68 - 1.34	More than 1.34
Winter:			
Electric Heat	1.0	2.4	3.8
Non-Electric Heat	0.9	2.0	3.4
Summer	0.9	1.7	2.6

Project Name: _____

Project Address: _____

Project No.: _____ Application Date: _____

WAREHOUSES (Refrigerated)

Gross Area: (Conditioned + Unconditioned) _____ sq.ft. (A)

Proposed Number of Shifts per Week _____ shifts/week
If operation is not known at this time, use 10.

Lighting Power Density _____ watts/sq.ft.
If the lighting power denisty is not known, use 1.0.

Compressor Horsepower _____ hp/sq.ft.
If this value is not known at this time, use 6.0.

Pulldown Temperature _____ degrees F.
Percentage of Product Subject to Pulldown _____

ENERGY USE kwh/sq.ft./year

STEP 1: Lighting Energy Use _____
Use Table RW-1 to obtain lighting energy use.

STEP 2: Refrigeration Energy Use _____
If the compressor horsepower is 2.0-4.5 hp/sq.ft., use 16.5.
If the horsepower is 4.6-7.0 hp/sq.ft., use 21.
If the horsepower is more than 7 hp/sq.ft., use 26.

STEP 3: Battery Charger Energy Use _____
If there are 5-10 shifts per week, use 0.8.
If there are 11-15 shifts per week, use 2.6.
If there are 16-21 shifts per week, use 3.3.

STEP 4: Miscellaneous Energy Use 0.8

STEP 5: ENERGY USE INDEX (EUI) _____ (B)

Add 1 through 4 to obtain the Total Energy Use Index.

PEAK DEMAND Watts./sq.ft.

STEP 6: Winter Peak Demand _____ (C)
If the pulldown load is over 10 degrees F. for 75% of the product, use 5.6.
If the pulldown load is less thant 75% or under 10 degrees F., use 3.1.
If the information is unknown at this time, use 4.3.

STEP 7: Summer Peak Demand _____ (D)
If the pulldown load is over 10 degrees F. for 75% of the product, use 8.5.
If the pulldown load is less than 75% or under 10 degrees F., use 5.7.
If the informaiton is unknown at this time, use 6.5.

TABLE RW-1
LIGHTING ENERGY USE
(kwh/sq.ft./yr.)

Shifts Per Week	Lighting Power Density (watts/sq. ft.)		
	Less than 0.34	0.34 - 0.66	More than 0.66
5 - 10	0.7	1.6	2.5
11 - 15	0.9	2.3	3.6
16 - 21	1.3	3.6	5.9